MINERALOGY AND PETROGRAPHY.[1]

The Rocks of the Thalhorn.—In the Thalhorn of the Upper Amariner Thal are found a porphyritic granite, between conglomerates composed of gabbro pebbles in a schistose matrix, and also serpentines, massive gabbro, schists, and various contact rocks. Linck[2] gives a good petrographical description of all these, and geological notes of their occurrence. The main granite mass is a portion of the well-known Kamm granite. It is found in dykes and flows, and it varies in its composition and structure from a typical granitite containing two feldspars, through porphyritic granite and syenite to lamprophyric minettes. The unaltered sediments near the eruptive are graywackes. On the contact with the granite the clastics are altered to knotty schists that are predominantly biotite schists flecked with light spots, consisting mainly of quartz and feldspar in micropegmatitic intergrowths, surrounded by biotite. Extreme alteration gives rise to hornstones, of which the writer recognizes several varieties. In these biotite, feldspar, hornblende and micropegmatite are so orientated as to resemble the poicilitic structure of many diabases and other basic rocks. Hornblende is abundant in them as needles scattered through the groundmass and as large phenocrysts. The conglomerates occupy the greater share of the writer's attention. In one group acid pebbles occur in a sandy or clayey matrix of basic detritus, in which biotite, feldspar and hornblende are new products of alteration. A second group includes rocks made up partly of gabbro material. Here the author again recognizes two groups, in one of which diallage and other gabbro constituents are occasionally present in the groundmass, and a second in which gabbro material forms a very large portion, either of the matrix or of the pebbly portion of the rock. In either case the rock is much altered, with the resulting formation of plagioclase and hornblende. The serpentine of the region was originally an olivine-enstatite rock and not a gabbro as has been supposed.

The New Jersey Eleolite-Syenite.—The New Jersey Eleolite-syenite dyke described by Emerson[3] is again studied by Kemp,[4] who

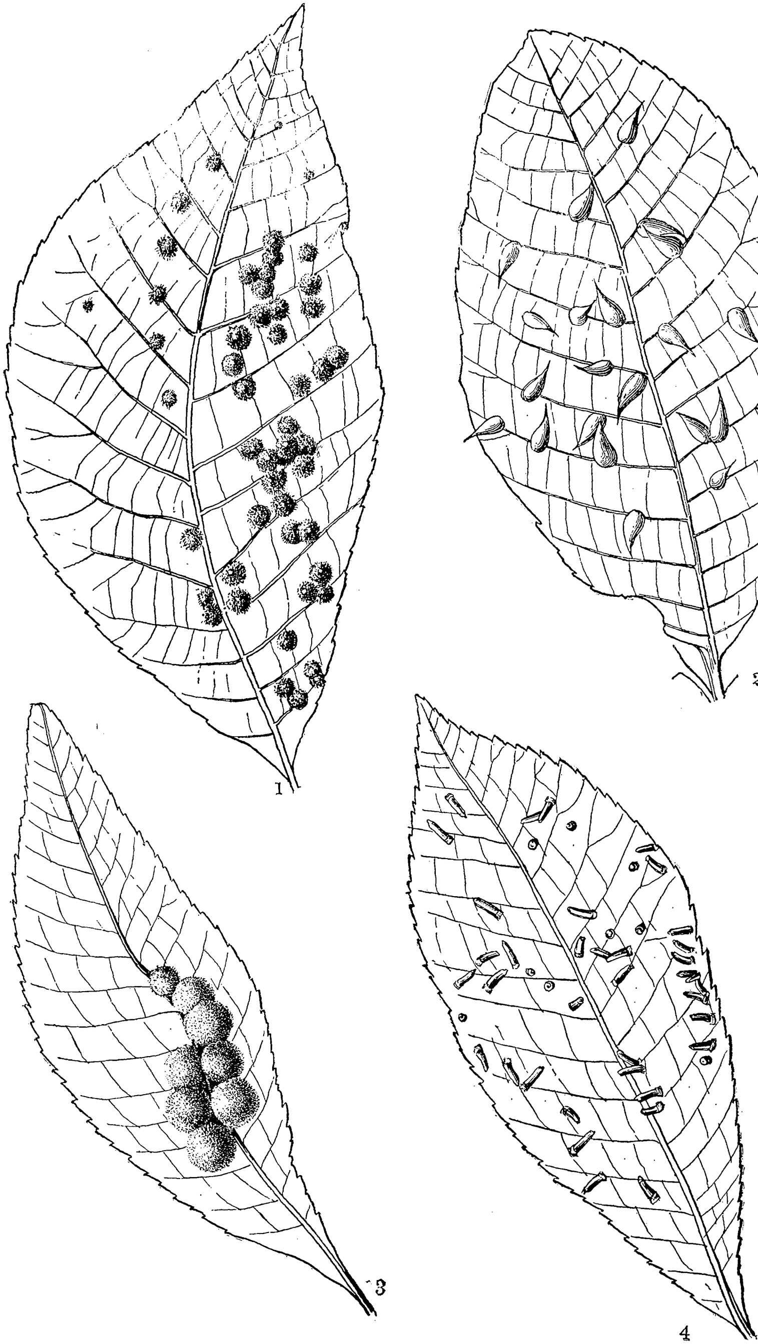
[1]Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2]Mitth. d. geol. Landesanst v. Elsass-Loth., iv, 1892.

[3]Amer. Jour. Science, iii, xxiii, p. 302.

[4]Trans. N. Y. Acad. Sci., Vol. xi, p. 60.

PLATE III.



1. *Cecidomyia holotricha* O. S.
2. *Cecidomyia caryæcola* O. S.
3. *Cecidomyia persicoides* O. S.
4. *Cecidomyia tubicola* O. S.

declares that the earlier description applies only to that phase of the rock occurring in the northern and the southern portions of its extent. The pyroxene throughout the dyke is aegerine. Cancrinite and sodalite are both fairly abundant in it. An analysis of specimens collected from about the point visited by Emerson gave:

SiO_2	Al_2O_3	Fe_2O_3	MnO	CaO	MgO	K_2O	Na_2O	Loss	Total
50.36	19.34	6.94	.41	3.43	not det.	7.17	7.64	3.51	=98.80

Eleolite porphyries with a tinguaitic groundmass are closely associated with the more abundant syenite, and along the eastern side of the great dyke are smaller ones of ouachitite and fourchite. The basic material of these small dykes, when first[5] studied, was regarded as porphyrite. Contact effects produced by the intrusion of the syenite through the surrounding shales are noticed on the east side of the dyke, where the sedimentaries have been changed to biotitic hornfels.

Mica Peridotite from Kentucky.—A mica peridotite[6] from a dyke in Crittenden Co., Ky., is composed essentially of biotite, serpentine, and perofskite, with smaller proportions of apatite, muscovite, magnetite, chlorite, calcite, and other secondary products. The biotite and serpentine constitute about 75% of the entire rock. The mica is in large plates in which are scattered the grains and shreds of serpentine. The composition of the rock follows:

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	K_2O	Na_2O	H_2O	P_2O_5	CO_2
33.84	3.78	5.88	7.04	5.16	9.46	22.96	2.04	.33	7.50	.89	.43

and small quantities of Cr_2O_3, MnO, NiO, CoO, BaO and Cl. The rock represents a new type of peridotite in which biotite takes the part of an amphiboloid in the more usual types.

Rhyolites in Maryland and Penn.—G. H. Williams[7] has identified an extensive series of old volcanic rocks in the South Mountain region of Pennsylvania and Maryland. The rocks have hitherto been considered sedimentaries, but to the writer they exhibit all the peculiarities of eruptives, though some of the beds are fragmental tufas and breccias. The two principal types are rhyolite and basalt. The former possesses all the features of recent eruptives, such as flowage

[5] Amer. Jour. Sci., III, xxxviii, p. 130.

[6] J. S. Diller, Amer. Jour. Sci., xliv, 1892, p. 286.

[7] Ib., xliv, 1892, p. 482.

lines, spherulites, lithophysae and amygdaloidal cavities. Quartz and an alkaline feldspar are the prevailing phenocrysts, while the groundmass is a quartz-feldspar mosaic. The basalts are much altered, but their structure is clearly that of an eruptive. A detailed account of the rocks is promised later.

The Nepheline and Leucite Rocks of Brazil.—A more careful study of a few of the Brazilian nepheline and leucite rocks undertaken by Hussak[8] has resulted in the discovery of leucite in some of the phonolites, and in the detection of leucite-tephrites containing pseudo-crystals. The leucitophyres consist of phenocrysts of sanidine, augite, nepheline and pseudo-leucites in a groundmass of small zeolitized leucites, augite, magnetite and nepheline. The leucite-tephrites are all characterized by the possession of the pseudo-leucites. In many cases these are nothing but spherical masses of the rock material surrounded by biotite plates. In other cases the biotite surrounds analcite or mixtures of analcite and calcite. The structure of several of these rocks is the diabasic. With these the author would place a rock described by Eigel[9] from the Cape Verde Islands, and the augite-porphyrite described by Kemp[10] from Deckertown, N. J., in both of which traces of leucite are thought to have been discovered. Hussak has also found a leucitite dyke in phonolite near Poços de Caldas, and a leucitite tufa composed of fragments of basalt, isolated crystals of leucite changed to analcite, pieces of augite and crystals of magnetite. The author concludes his paper with remarks on 'pseudo-crystals' combating the view of Derby that they are true leucite crystals filled with inclusions of the rock's groundmass.

The last named writer[11] has examined the Peak of Tingua with some care, finding eleolite-syenite, phonolite and dykes of basic rocks. The syenite and phonolite are thought to be phases of the same magma, as they apparently grade into one another. The phonolitic phase occurs both in dykes and in flows associated with phonolite tufas. The origin of the pseudo-crystals is discussed briefly.

Petrographical News.—Brauns[12] has discovered hauyne in the pumice sandstone near Marburg, a mineral hitherto unobserved in the

[8]Neues. Jahrb. f. Min., etc., 1892, II, p. 141.

[9]AMERICAN NATURALST, Feb., 1892, p. 165.

[10]See above under 'The New Jersey Eleolite-Syenite.'

[11]Quart. Jour. Geol. Soc., May, 1891, p. 251.

[12]Zeits. d. deutsch. geol. Gesell., xliv, 1892, p. 149.

rock because of the loss of its characteristic blue color through alteration. The list of minerals common to this rock and to those of the Laacher See is now complete, so that the belief in a common origin for them is rendered almost a certainty.

C. W. Hall[13] gives a few notes on rocks collected from Central Wisconsin, describing very briefly hypersthene and quartz gabbros in which there is much secondary hornblende, and quartz diorites and gneisses regarded as squeezed gabbros.

A fourchite boulder in which are large arfvedsonite phenocrysts is mentioned by Kemp[14] as occurring at Aurora, Cayuga Co., N. Y. The same author mentions the existence of rhyolite, hypersthene, andesite and andalusite-hornstone from near Gold Hill, Toole Co., Utah.

Spherulites[15] of andalusite occur in the carboniferous clastic schists of Beaujeu, France. The schists are composed of black and white mica fragments in a paste of sericite and hematite.

Turner[16] makes brief mention of basaltic, andesitic and rhyolitic lavas, whose source was the late Tertiary cone Mt. Ingalls, in California.

Crystallographic Study of Diopsides.—Some very careful crystallographic observations have been made by A. Schmidt[17] upon the diopsides of the Alathal, of Achmatowsk, of Nordmark, of the Zillerthal and the Arany-Berg. Many crystals from each of these famous localities were examined, and much new data was obtained concerning the mineral. The following new planes were discovered: $4P\bar{2}$ and $5P\frac{5}{3}$ on the white diopside from Achmatowsk; $\frac{11}{5}P\grave{\infty}$ on the green variety from the same place; $\infty P6'$ in the Nordmark species; $\infty P\bar{10}$, $\infty P4'$ and $\infty P\frac{\bar{7}}{5}$ on the nearly colorless small crystals from Schwarzenstein in the Zillerthal, and $\infty P\bar{7}$ and $P\bar{4}$ on the black Arany-Berg mineral. The form $P\bar{4}$ appears in Goldschmidt's 'Index,' but no reference to it could be found by the author in the original memoirs. The axial ratios of the different varieties are:

Alathal	1.0895 : 1 : .5894	$\beta = 74°15'47''$
Achmatowsk (white)	1.0909 : 1 : .5899	$\beta = 74°10'42''$
Achmatowsk (green)	1.0951 : 1 : .5985	$\beta = 73°31'8''$

[13] Minn. Ac. Nat. Science, III, No. 2, p. 251.

[14] Trans. N. Y. Acad. Sci., xi, p. 92.

[15] Lévy. Bull. Soc. Franç d. Min., xv, 1892, p. 121.

[16] Amer. Jour. Sci., Dec., 1892, p. 455.

[17] Zeits. f. Kryst., xxi, 1892, p. 1.

Nordmark...............................	$1.0915 : 1 : .5848 \ \beta = 74°38'59''$
Zillerthal (colorless)....................	$1.0922 : 1 : .5887 \ \beta = 74°16'28''$
Arany-Berg (yellow)....................	$1.0945 : 1 : .5918 \ \beta = 74°19'38''$
Arany-Berg (black)..................	$1.0913 : 1 : .5875 \ \beta = 74° \ 4'53''$

The optical angle for the Nordmark crystals is $2V_{na} = 60°44'$, and $C \wedge c = 45°21'$. For the dark Zillerthal diopside $2V_{na} = 58°56'$ and $C \wedge c = 34°4'$.

Herderite from Hebron, Maine.—A single specimen of Herderite from Hebron, Maine, is described by Wells and Penfield[18] as a few yellowish white crystals on albite. The crystals have a tabular habit, with oP, ∞ P, 3P and $\frac{3}{2}$P the only forms observed. The density is 2.975 and composition:

P_2O_5	BeO	CaO (by diff.)	H_2O	F	Insol.	Total
40.81	15.32	32.54	5.83	.40	5.27	= 100.17

Corresponding to Ca Be (OH) PO_4, or a herderite in which nearly all of the fluorine is replaced by hydroxyl.

Mineralogical Notes—A *calcium carbonate* of secondary origin from the Marble Mountains of Wolmsdorf in Glatz has been analyzed by Kosmann[19] with the following astounding result: Ca CO_3 = 4.32; chemically combined H_2O = 1.54; mechanically combined H_2O = 94.13. The author believes the mineral to be a hydrated carbonate $CaCO_3 + 2H_2O$ capable of absorbing a large quantity of water, similar to the 'Mountain Milk' of Rose.

The *friedelite* of the Manganese mine of Sjogrube, Orebro, Sweden, occurs in large quantity in clefts, veins, etc., that are partially filled with calcite. An analysis yielded Igelström:[20]

SiO_2	Cl	MnO	FeO	CaO	MgO	NaO	H_2O	Total
34.36	3.00	45.88	1.35	1.50	1.50	2.79	9.00	= 99.38

On the *Azurite* from the Laurion Mts., Greece, Zimanyi[21] has found 28 forms, three of which ($\frac{2}{5}P\bar{\infty}$, $\frac{4}{5}P\bar{\infty}$ and $\frac{6}{5}P\bar{\infty}$) are new. The crystals have the usual habit of the mineral, and they compare favorably in beauty with those from Chessy, Arizona and Utah.

[18]Amer. Jour. Sci., xliv, 1892, p. 114.

[19]Zeits. d. deutsch. geol. Ges., xliv, 1892, p. 155.

[20]Zeits. f. Kryst., xxi, p. 92.

[21]Ib., xxi, p. 86.

Tremolite[22] pseudomorphs after sahlite from the limestone of Canaan, Ct., have the composition:

SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	K_2O	Na_2O
60.98	.10	.12	.19	14.64	23.62	.13	.21

The controversy over the nature of *Melanophlogite* is not yet ended. Bombicci[23] has recently defended himself against the attack of Friedel, and in his defense he accuses his opponent with misquoting him.

New Minerals.—*Ganophyllite,* from Harstige, near Pajsberg, Sweden, is a manganese zeolite[24] that is associated with barite, lead, and rhodonite. It occurs in large brown monoclinic, prismatic crystals, in which ∞ P is combined with the base and the clinodome. $a : b : c = .413 : 1 : 1.831$. $\beta = 86°39'$. On cleavage plates parallel to oP a percussion figure may be produced, one of whose rays is parallel to a and the other two inclined at 60° to this. Plane of optical axes is perpendicular to $\infty \grave{P}\infty$, with c the first bisectrix. 2E (air) = 41°53′ for sodium light, and 2V = 23°52′. The pleochroism is strong $c = A$ = yellow-brown; $a = B$ and $b = C$ = colorless. The density is 2.84 and hardness = 4. A mean of two analyses gave Hamberg a result that may be represented by $8SiO_2\,Al_2O_3\,7MnO + 6H_2O$.′

SiO_2	Al_2O_3	Fe_2O_3	MnO	CaO	MgO	PbO(?)	K_2O	Na_2O	H_2O	Total
39.67	7.95	.90	35.15	1.11	.20	.20	2.70	2.18	9.79 =	99.85

Pyrophanite, described by the same author as occurring in the same mine, is a manganese titanium compound isomorphous with ilmenite. An analysis gave:

SiO_2	TiO_2	MnO	Fe_2O_3	Sb_2O_3	Total
1.58	50.49	46.92	1.16	.48 =	100.63

It is found as brilliant, deep red, transparent tables, associated with ganophyllite. $a : c = 1 : 1.369$. The double refraction is strong, and the indices of refraction for sodium light are $\omega = 2.481$, $\epsilon = 2.21$. Density is 4.537.

Synthesis of the Members of the Sodalite Group.—The minerals of the sodalite group have been manufactured by Morozie-

[22]W. H. Hobbs. Amer. Geol., July, 1892, p. 44.

[23]Bull. d. l. Soc. Franç d. Min., xv, p. 144.

[24]Ref. Neues. Jahrb. f. Min., etc., 1892, II, p. 234.

wics[25] as microscopic crystals. A mixture of 65 parts $SiO_2 + 3Aq$, 44 parts $Al_2O_3 + 3Aq$, and 33 parts gypsum, heated in a platinum crucible with an excess of Glauber's salt, yielded tiny cubes and dodecahedra of hauyne or sodalite. When heated with an excess of $Na_2SO_4 + NaCl$ a substance was obtained that is supposed to be an isomorphous mixture of the two minerals above mentioned, and in addition some sodalite crystals were produced. When heated with Na Cl alone sodalite only resulted.

Methods and Instruments.—A simple method for determining the value of the optical angle in thin sections of minerals is described by Lane.[26] It consists essentially of the measurement of the angular distance between the hyperbolas of the biaxial interference figure by means of the sub-stage mirror.

A cheap form of crystal refractometer constructed on the same principles as the larger Zeiss instrument has been made by Czapske.[27] The height of the complete instrument is only 25 cm. It is suitable for all ordinary refraction work.

An Appendix to the "Gems of North America."—Mr. Kunz has issued an appendix to his valuable 'Gems and Precious Stones of North America'[28] that brings the volume up to date. Most of the material in the appended chapter has appeared in the journals, but some of the information it contains is new. The author states that the sapphire gravels of Ruby Bar, Montana, and the turquoise mines of New Mexico are now being worked by companies that expect their outlay of capital justified by a goodly yield of gem material. The turquoise company has already taken from their diggings about a hundred thousand dollars worth of gems.

[25] Neues. Jahrb. f. Min., etc., 1892, II, p. 139.

[26] Science, Dec. 23, 1892, p. 354.

[27] Neues. Jahrb. f. Min., etc., 1892, I, p. 209.

[28] Cf., AMER. NATURALIST, Dec., 1891, p. 1119.